PCT

WORLD INTELLECTUAL PROPERTY ORGANIZATION
International Bureau

INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(51) International Patent Classification 6 : A61D 9/00, A61L 15/42

A1

(11) International Publication Number: WO 96/28113

(43) International Publication Date: 19 September 1996 (19.09.96)

(21) International Application Number: PCT/US96/01760

(22) International Filing Date: 9 February 1996 (09.02.96)

(30) Priority Data:
08/404,835 15 March 1995 (15.03.95) US

(71) Applicant: KIMBERLY-CLARK CORPORATION [US/US]; 401 North Lake Street, Neenah, WI 54956 (US).

(72) Inventors: DOWNEY, Daniel, Frank; 1097 Tennyson Place, Atlanta, GA 30319 (US). FAASS, Judith, Katherine, Woollen; 7585 Blacks Mill Road, Dawsonville, GA 30534 (US).

(74) Agents: ROBINSON, James, B. et al.; Kimberly-Clark Corporation, 401 North Lake Street, Neenah, WI 54956 (US).

(81) Designated States: AM, AT, AU, BB, BG, BR, BY, CA, CH, CN, CZ, DE, DK, EE, ES, FI, GB, GE, HU, IS, JP, KE, KG, KP, KR, KZ, LK, LR, LT, LU, LV, MD, MG, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, TJ, TM, TR, TT, UA, UG, UZ, VN, ARIPO patent (KE, LS, MW, SD, SZ, UG), European patent (AT, BE, CH, DE, DK, ES, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, ML, MR, NE, SN, TD, TG).

Published
With international search report.
Before the expiration of the time limit for amending the claims and to be republished in the event of the receipt of amendments.

(54) Title: VETERINARY BANDAGE WITH CHEW REPELLENT FEATURE

(57) Abstract

There is provided an elastic veterinary bandage having anti-chew properties comprising an elastic substrate, and an anti-chew substance in an effective amount internally added to a material which may be the substrate, an adhesive-based substrate printing ink, an adhesive or cohesive substrate coating and combinations thereof. The anti-chew substance is preferably oleo resin of capsicum, capsaicin and its derivatives, and pelargonic acid vanillylamide, and is present in an amount between 10 and 10000 ppm. In one embodiment, the bandage is a cohesive, breathable and stretchable veterinary bandage having anti-chew properties comprising a nonwoven laminate having at least one elastomeric and at least one relatively nonelastic gatherable material joined to the elastomeric material at spaced-apart locations so that the gatherable material is gathered between the spaced-apart locations, and a coating of a cohesive material on at least a portion of at least one exterior surface of said laminate, and an anti-chew compound in an effective amount included in a component which may be the elastomeric material, the relatively nonelastic gatherable material, the coating, an optional printing ink, or combinations thereof.

FOR THE PURPOSES OF INFORMATION ONLY

Codes used to identify States party to the PCT on the front pages of pamphlets publishing international applications under the PCT.

AM	Armenia	GB	United Kingdom	MW	Malawi
AT	Austria	GE	Georgia	MX	Mexico
AU	Australia	GN	Guinea	NE	Niger
BB	Barbados	GR	Greece	NL	Netherlands
BE	Belgium	HU	Hungary	NO	Norway
BF	Burkina Faso	IE	Ireland	NZ	New Zealand
BG	Bulgaria	IT	Italy	PL	Poland
BJ	Benin	JP	Japan	PT	Portugal
BR	Brazil	KE	Kenya	RO	Romania
BY	Belarus	KG	Kyrgystan	RU	Russian Federation
CA	Canada	KP	Democratic People's Republic of Korea	SD	Sudan
CF	Central African Republic			SE	Sweden
CG	Congo	KR	Republic of Korea	SG	Singapore
CH	Switzerland	KZ	Kazakhstan	SI	Slovenia
CI	Côte d'Ivoire	LI	Liechtenstein	SK	Slovakia
CM	Cameroon	LK	Sri Lanka	SN	Senegal
CN	China	LR	Liberia	SZ	Swaziland
CS	Czechoslovakia	LT	Lithuania	TD	Chad
CZ	Czech Republic	LU	Luxembourg	TG	Togo
DE	Germany	LV	Latvia	TJ	Tajikistan
DK	Denmark	MC	Monaco	TT	Trinidad and Tobago
EE	Estonia	MD	Republic of Moldova	UA	Ukraine
ES	Spain	MG	Madagascar	UG	Uganda
FI	Finland	ML	Mali	US	United States of America
FR	France	MN	Mongolia	UZ	Uzbekistan
GA	Gabon	MR	Mauritania	VN	Viet Nam

VETERINARY BANDAGE WITH CHEW REPELLENT FEATURE

BACKGROUND OF THE INVENTION

Veterinarians and others use bandages on animals to protect injured skin, support bones and muscles, and prevent injury or re-injury. Bandages are also used in a variety of other veterinary applications such as prohibiting dogs from licking in a particular area, a problem known as acral lick dermatitis, lick granuloma or as protection after surgery.

Veterinary bandages serve the purpose of protecting the wound from dirt and germs yet allow airflow to the damaged area. Such bandages must be stretchable and breathable. It is also preferable that such bandages be cohesive, though bandages are known which use tape or other means for securing in place.

Obviously, bandages for these purposes must remain in place in order to carry out their intended function. It is presumed, however, that horses, dogs and other animals feel the bandage is uncomfortable or otherwise foreign and therefore want to remove it, generally by licking and chewing. A bandage which is easily removed by the animal will be of little or no good to the animal and will only serve as a source of frustration for the owner and veterinarian. A bandage with is easily removed or comes apart easily can also pose a choking hazard for the animal if the bandage, threads or other parts wrap around the neck of the animal or become lodged in the throat upon swallowing.

One solution to this problem has been to treat the bandage with a topical repellent as a liquid, paste, spray or gel which is applied to bandages after the bandages are applied to the

animal and which serves as a deterrent to chewing. Examples of such topical materials include RAPLAST® spray and CHEW-GUARD® spray. These topical repellents may also be applied to wood, blankets, etc., to prevent chewing of these things as well.

Topical repellents are effective for a time but can be washed off, rubbed off, etc. and so must be reapplied or they become ineffective. When applied to a bandage on an animal, only the last layer of the bandage is treated, making the deterrent effective for only as long as the animal does not remove that last layer. Should the last layer somehow be removed, removal of the balance of the untreated bandage is simple.

Another solution to the problem of chewing the bandage has been to enclose the head of the animal in a restraint of some sort to prevent him from reaching the bandage with his teeth. Examples of such structures are cones around the neck or cages over the snout of the animal and restrict his movement. Such devices have obvious drawbacks in that they also may restrict the vision of the animal or prevent him from eating or drinking.

Yet another solution has been to encase the bandage in a hard material, akin to a cast, which will resist chewing far better than a bandage. This method, of course, also restricts the movement of a bandaged limb and restricts airflow to the bandaged area.

There remains a need for a bandage which is repellent to chewing, easy to use, and unrestrictive to the animal's movement, so that the animal will not remove the bandage and so that it will carry out its intended purpose. When the bandage is wrapped around an animal's limb, all layers of the bandage should deter removal so that if the outer layer is somehow removed, the balance of the bandage will still deter removal by chewing. It is preferable that such a bandage be cohesive, breathable and stretchable.

It is therefore an object of this invention to make a bandage which deters or is repellent to chewing, is easy to use, and is relatively unrestrictive to animal movement. A

preferred embodiment of such a bandage is cohesive, breathable and stretchable. It is also an objective to make a deterrent or repellent article which may be applied to inanimate objects to protect them from being chewed by animals. It is also an object of this invention to make such repellency durable, so that it will not be washed or rubbed away and will remain a property of such a bandage for as long as it is used.

SUMMARY OF THE INVENTION

The objects of the invention are provided by an elastic veterinary bandage having anti-chew properties comprising an elastic substrate, and an anti-chew substance in an effective amount internally added to a material which may be the substrate itself, an adhesive-based substrate printing ink, an adhesive or cohesive substrate coating and combinations thereof.

The anti-chew substance is preferably oleo resin of capsicum, capsaicin and its derivatives, and pelargonic acid vanillylamide, and is present in an amount between 10 and 10000 ppm.

In one embodiment the bandage is a cohesive, breathable and stretchable veterinary bandage having anti-chew properties comprising a nonwoven laminate having at least one elastomeric and at least one relatively nonelastic gatherable material joined to the elastomeric material at spaced apart locations so that the gatherable material is gathered between the spaced apart locations, and a coating of a cohesive material on at least a portion of at least one exterior surface of said laminate, and an anti-chew compound in an effective amount included in a component which may be the elastomeric material, the relatively nonelastic gatherable material, the coating, an optional printing ink, or combinations thereof.

DEFINITIONS

As used herein the term "nonwoven fabric or web" means a web having a structure of individual fibers or threads which are interlaid, but not in a repetitive, identifiable manner as in a knitted fabric. Nonwoven fabrics or webs have been formed from many processes such as for example, meltblowing processes, spunbonding processes, and bonded carded web processes. The basis weight of nonwoven fabrics is usually expressed in ounces of material per square yard (osy) or grams per square meter (gsm) and the fiber diameters useful are usually expressed in microns. (Note that to convert from osy to gsm, multiply osy by 33.91).

As used herein the term "microfibers" means small diameter fibers having an average diameter not greater than about 75 microns, for example, having an average diameter of from about 0.5 microns to about 50 microns, or more particularly, microfibers may have an average diameter of from about 2 microns to about 40 microns. Another frequently used expression of fiber diameter is denier, which is defined as grams per 9000 meters of a fiber. For example, the diameter of a polypropylene fiber given in microns may be converted to denier by squaring, and multiplying the result by 0.00629, thus, a 15 micron polypropylene fiber has a denier of about 1.42 (15^2 x 0.00629 = 1.415).

As used herein the term "spunbonded fibers" refers to small diameter fibers which are formed by extruding molten thermoplastic material as filaments from a plurality of fine, usually circular capillaries of a spinnerette with the diameter of the extruded filaments then being rapidly reduced as by, for example, in U.S. Patent no. 4,340,563 to Appel et al., and U.S. Patent no. 3,692,618 to Dorschner et al., U.S. Patent no. 3,802,817 to Matsuki et al., U.S. Patent nos. 3,338,992 and 3,341,394 to Kinney, U.S. Patent no. 3,502,763 to Hartman, U.S. Patent 3,502,538 to Levy, and U.S. Patent no. 3,542,615 to Dobo et al. Spunbond fibers are generally not tacky when they are deposited onto a collecting surface. Spunbond fibers are

generally continuous and have diameters larger than 7 microns, more particularly, between about 10 and 20 microns.

As used herein the term "meltblown fibers" means fibers formed by extruding a molten thermoplastic material through a plurality of fine, usually circular, die capillaries as molten threads or filaments into converging, usually heated, high velocity gas (e.g. air) streams which attenuate the filaments of molten thermoplastic material to reduce their diameter, which may be to microfiber diameter. Thereafter, the meltblown fibers are carried by the high velocity gas stream and are deposited on a collecting surface to form a web of randomly disbursed meltblown fibers. Such a process is disclosed, for example, in U.S. Patent no. 3,849,241 to Butin. Meltblown fibers are microfibers which may be continuous or discontinuous, are generally smaller than 10 microns in diameter, and are generally tacky when deposited onto a collecting surface so as to be self-bonding as a web or mat.

As used herein the term "composite elastic material" refers to an elastic material which may be a multicomponent material or a multilayer material. For example, a multilayer material may have at least one elastic layer joined to at least one gatherable layer at least at two locations so that the gatherable layer is gathered between the locations where it is joined to the elastic layer. Such a multilayer composite elastic material may be stretched to the extent that the nonelastic material gathered between the bond locations allows the elastic material to elongate. This type of multilayer composite elastic material is disclosed, for example, by U.S. Patent 4,720,415 to Vander Wielen et al., which is hereby incorporated by reference.

As used herein the term "polymer" generally includes but is not limited to, homopolymers, copolymers, such as for example, block, graft, random and alternating copolymers, terpolymers, etc. and blends and modifications thereof. Furthermore, unless otherwise specifically limited, the term "polymer" shall include all possible geometrical configuration of the material.

These configurations include, but are not limited to isotactic, syndiotactic and random symmetries.

As used herein, the term "machine direction" or "MD" means the direction of a fabric in the direction in which it is produced. The term "cross machine direction" or "CD" means the direction across the fabric, i.e. a direction generally perpendicular to the MD.

As used herein the term "monocomponent" fiber refers to a fiber formed from one or more extruders using only one polymer. This is not meant to exclude fibers formed from one polymer to which small amounts of additives have been added for coloration, anti-static properties, lubrication or other processing aid, hydrophilicity, etc. These additives, e.g. titanium dioxide for coloration, are generally present in an amount less than 5 weight percent and more typically about 2 weight percent.

As used herein the term "conjugate fibers" refers to fibers which have been formed from at least two polymers extruded from separate extruders but spun together to form one fiber. The polymers are usually different from each other though conjugate fibers may be homopolymer fibers. The polymers are arranged in substantially constantly positioned distinct zones across the cross-section of the conjugate fibers and extend continuously along the length of the conjugate fibers. The configuration of such a conjugate fiber may be, for example, a sheath/core arrangement wherein one polymer is surrounded by another or may be a side by side arrangement or an "islands-in-the-sea" arrangement. Conjugate fibers are taught in U.S. Patent 5,108,820 to Kaneko et al., U.S. Patent 5,336,552 to Strack et al., and U.S. Patent 5,382,400. For two component fibers, the polymers may be present in ratios of 75/25, 50/50, 25/75 or any other desired ratios.

As used herein the term "biconstituent fibers" refers to fibers which have been formed from at least two polymers extruded from the same extruder as a blend. The term "blend" is defined below. Biconstituent fibers do not have the various polymer components arranged in relatively constantly positioned

distinct zones across the cross-sectional area of the fiber along its length and the various polymers are usually not continuous along the entire length of the fiber, instead usually forming protofibrils which start and end at random. Biconstituent fibers are sometimes also referred to as multiconstituent fibers. Fibers of this general type are discussed in, for example, U.S. Patent 5,108,827 to Gessner. Conjugate and biconstituent fibers are also discussed in the textbook Polymer Blends and Composites by John A. Manson and Leslie H. Sperling, copyright 1976 by Plenum Press, a division of Plenum Publishing Corporation of New York, IBSN 0-306-30831-2, at pages 273 through 277.

As used herein the term "blend" means a mixture of two or more polymers while the term "alloy" means a sub-class of blends wherein the components are immiscible but have been compatibilized. "Miscibility" and "immiscibility" are defined as blends having negative and positive values, respectively, for the free energy of mixing. Further, "compatibilization" is defined as the process of modifying the interfacial properties of an immiscible polymer blend in order to make an alloy.

As used herein, through air bonding or "TAB" means a process of bonding a nonwoven conjugate fiber web using air which is sufficiently hot to melt one of the polymers of which the fibers of the web are made. One example of TAB is wherein a web is wound at least partially around a perforated roller which is enclosed in a hood. The air is forced from the hood, through the web and into the perforated roller. The air velocity is between 100 and 500 feet per minute and the dwell time may be as long as 6 seconds. The melting and resolidification of the polymer provides the bonding. Through air bonding has restricted variability and is generally regarded a second step bonding process. Since TAB requires the melting of at least one component to accomplish bonding, it is restricted to conjugate fiber webs or those with multiple components which may include adhesives.

As used herein, the term "stitchbonded" means, for example, the stitching of a material in accordance with U.S. Patent

4,891,957 to Strack et al. or U.S. Patent 4,631,933 to Carey, Jr.

As used herein, "ultrasonic bonding" means a process performed, for example, by passing the fabric between a sonic horn and anvil roll as illustrated in U.S. Patent 4,374,888 to Bornslaeger.

As used herein, "thermal point bonding" involves passing a fabric or web of fibers to be bonded between a heated calender roll and an anvil roll. The calender roll is usually patterned in some way so that the entire fabric is not bonded across its entire surface. As a result, various patterns for calender rolls have been developed for functional as well as aesthetic reasons. One example is the Hansen Pennings or "H&P" pattern with about a 30% bond area with about 100 bonds/square inch as taught in U.S. Patent 3,855,046 to Hansen and Pennings. The H&P pattern has square pin bonding areas wherein each pin has a side dimension of 0.038 inches (0.965 mm), a spacing of 0.070 inches (1.778 mm) between pins, and a depth of bonding of 0.023 inches (0.584 mm). The resulting pattern has a bonded area of about 29.5%. Another typical bonding pattern is the expanded Hansen and Pennings or "EHP" bond pattern which produces a 15% bond area with a square pin having a side dimension of 0.037 inches (0.94 mm), a pin spacing of 0.097 inches (2.464 mm) and a depth of 0.039 inches (0.991 mm). Another typical bonding pattern designated "714" has square pin bonding areas wherein each pin has a side dimension of 0.023 inches, a spacing of 0.062 inches (1.575 mm) between pins, and a depth of bonding of 0.033 inches (0.838 mm). The resulting pattern has a bonded area of about 15%. Other common patterns include a diamond pattern with repeating and slightly offset diamonds and a wire weave pattern looking as the name suggests, e.g. like a window screen. Typically, the percent bonding area varies from around 10% to around 30% of the area of the fabric laminate web.

DETAILED DESCRIPTION OF THE INVENTION

The objects of this invention are achieved by the provision of a bandage into which has been incorporated an anti-chew or chew repellent substance. The inventors have found that incorporating the anti-chew material into a component of the bandage itself results in protection that has far greater durability because it goes into some depth of the bandage. This penetration into the bandage makes it nearly impossible for the anti-chew substance to be licked, washed or rubbed off. Such a bandage is easier for the user to apply since it involves no additional steps beyond the application of the bandage to the animal. Since there is no need to reapply a repellent to the bandages of this invention, such bandages should be more economical for the consumer than separate bandages and sprays. The bandage of this invention also avoids the need to restrict the range of movement of the animal with a cast over the bandage or a cone or cage over the head.

Veterinary bandages have been made from elastic woven materials which are wound around a limb, for example, and secured with tape, adhesive coatings or other means, or elastic nonwoven materials which may be secured in the same manner or may be self-adhesive. An example of a woven bandage is the Ace bandage which must be secured with tape, VELCRO® material, pins, etc. Examples of nonwoven bandages include VETRAP® and EQUISPORT® wraps from the Minnesota Mining and Manufacturing Company. Elastic materials may have elastic threads running throughout the material, generally in one direction, to provide stretch. Another elastic material is a cohesive, compressible wrap which is relatively permeable to air and water vapor and is available under the trade designation FLEXUS® wrap from the Kimberly-Clark Corporation. FLEXUS® wrap uses an elastic nonwoven material laminated to other layers which are then coated to create the cohesive nonwoven bandage. FLEXUS® wrap is described in U.S. Patent application 07/995,468 (the '468 application) to Faass and assigned to the same assignee as this application. For the purposes of describing the instant

invention, all of the above as well as other materials which may function as an elastic material or base sheet for a bandage shall be included in the term "substrate".

The '468 application describes a material having at least one elastic composite material and a coating of a cohesive material on at least a portion of at least one exterior surface of the elastic composite material so that the material is capable of being compressed in the Z-direction at least about 45 percent at a pressure of about 3 psi to a thickness of not less than about 0.035 inch (0.89 mm). For example, the cohesive material may be capable of being compressed din the Z-direction at least about 55 percent at a pressure of about 3 psi to a thickness of not less than about 0.035 inch. As a further example, the cohesive material may be capable of being compressed in the Z-direction at least about 55 percent at a pressure of about 3 psi to a thickness of ranging from about 0.040 inch (1.0 mm) to about 0.2 inch (5.1 mm). As another example, the cohesive material may be capable of being compressed in the Z-direction at least bout 35 percent at a pressure of about 1 psi to a thickness of not less than about 0.035 inch.

The elastic material of the '468 application is preferably a nonwoven web of elastomeric meltblown thermoplastic polymer fibers. Elastomeric meltblown thermoplastic polymers useful in the practice of this invention may be those made from block copolymers such as polyurethanes, copolyether esters, polyamide polyether block copolymers, ethylene vinyl acetates (EVA), copoly(styrene/ethylene-butylene) and the like.

Commercial examples of such elastomeric copolymers are, for example, those known as KRATON® materials which are available from Shell Chemical Company of Houston, Texas. KRATON® block copolymers are available in several different formulations, a number of which are identified in U.S. Patent 4,663,220, hereby incorporated by reference. A particularly suitable elastomeric layer may be formed from, for example, elastomeric poly(styrene/ethylene-butylene/styrene) block copolymer

available from the Shell Chemical Company of Houston, Texas under the trade designation KRATON® G-1657.

Other exemplary elastomeric materials which may be used to form an elastomeric layer include polyurethane elastomeric materials such as, for example, those available under the trademark ESTANE® from B. F. Goodrich & Co., polyamide polyether block copolymer such as, for example, that known as PEBAX®,available from Atochem Inc. Polymers Division, of Glen Rock, New Jersey and polyester elastomeric materials such as, for example, those available under the trade designation HYTREL® from E. I. DuPont De Nemours & Company.

Formation of an elastomeric nonwoven web from polyester elastomeric materials is disclosed in, for example, U.S. Patent No. 4,741,949 to Morman et al., hereby incorporated by reference. Elastomeric layers may also be formed from elastomeric copolymers of ethylene and at least one vinyl monomer such as, for example, vinyl acetates, unsaturated aliphatic monocarboxylic acids, and esters of such monocarboxylic acids. The elastomeric copolymers and formation of elastomeric nonwoven webs from those elastomeric copolymers are disclosed in, for example, U.S. Patent No. 4,803,117 to Daponte. Particularly useful elastomeric meltblown thermoplastic webs are composed of fibers of a material such as disclosed in U.S. Patent 4,707,398 to Boggs, U.S. Patent 4,741,949 to Morman et al., and U.S. Patent 4,663,220 to Wisneski et al. In addition, the elastomeric meltblown thermoplastic polymer layer may itself be composed of one or more thinner layers of elastomeric meltblown thermoplastic polymer which have been sequentially deposited one atop the other or laminated together by methods known to those skilled in the art.

The thermoplastic copolyester elastomers include copolyetheresters having the general formula:

$$H-([O-G-\overset{O}{\overset{\|}{C}}-(C_6H_4)-\overset{O}{\overset{\|}{C}}]_x-[O(CH_2)_a-O-\overset{O}{\overset{\|}{C}}-(C_6H_4)-\overset{O}{\overset{\|}{C}}]_y)_z-O(CH_2)_bOH$$

where "G" is selected from the group consisting of poly(oxyethylene)-alpha,omega-diol, poly(oxypropylene)-

alpha,omega-diol, poly(oxytetramethylene)-alpha,omega-diol and "a" and "b" are positive integers including 2, 4 and 6, "x", "y", and "z" are positive integers including 1-20. Such materials generally have an elongation at break of from about 600 percent to 750 percent when measured in accordance with ASTM D-638 and a melt point of from about 350°F to about 400°F (176 to 205°C) when measured in accordance with ASTM D-2117. Commercial examples of such copolyester materials are, for example, those known as ARNITEL®, formerly available from Akzo Plastics of Arnhem, Holland and now available from DSM of Sittard, Holland, or those known as HYTREL® which are available from E.I. duPont de Nemours of Wilmington, Delaware.

Processing aids may be added to the elastomeric polymer as well. A polyolefin, for example, may be blended with the elastomeric polymer (e.g., the elastomeric block copolymer) to improve the processability of the composition. The polyolefin must be one which, when so blended and subjected to an appropriate combination of elevated pressure and elevated temperature conditions, is extrudable, in blended form, with the elastomeric polymer. Useful blending polyolefin materials include, for example, polyethylene, polypropylene and polybutene, including ethylene copolymers, propylene copolymers and butene copolymers. A particularly useful polyethylene may be obtained from the U.S.I. Chemical Company under the trade designation Petrothene NA 601 (also referred to herein as PE NA 601 or polyethylene NA 601). Two or more of the polyolefins may be utilized. Extrudable blends of elastomeric polymers and polyolefins are disclosed in, for example, previously referenced U.S. Patent No. 4,663,220.

Desirably, the elastomeric meltblown fibers should have some tackiness or adhesiveness to enhance autogenous bonding. For example, the elastomeric polymer itself may be tacky when formed into fibers or, alternatively, a compatible tackifying resin may be added to the extrudable elastomeric compositions described above to provide tackified elastomeric fibers that autogenously bond. The tackifying resins and tackified

extrudable elastomeric compositions as disclosed in U.S. patent No. 4,787,699, hereby incorporated by reference, are suitable.

Any tackifier resin can be used which is compatible with the elastomeric polymer and can withstand the high processing (e.g., extrusion) temperatures. If the elastomeric polymer (e.g., elastomeric block copolymer) is blended with processing aids such as, for example, polyolefins or extending oils, the tackifier resin should also be compatible with those processing aids. Generally, hydrogenated hydrocarbon resins are preferred tackifying resins, because of their better temperature stability. REGALREZ™ and ARKON™ P series tackifiers are examples of hydrogenated hydrocarbon resins. ZONATAK™501 lite is an example of a terpene hydrocarbon. REGALREZ™ hydrocarbon resins are available from Hercules Incorporated. ARKON™ P series resins are available from Arakawa Chemical (U.S.A.) Incorporated. Other tackifying resins which are compatible with the other components of the composition and can withstand the high processing temperatures, can also be used.

Typically, the blend used to form the elastomeric fibers includes, for example, from about 40 to about 80 percent by weight elastomeric polymer, from about 5 to about 40 percent processing aid and from about 5 to about 40 percent resin tackifier. For example, a particularly useful composition included, by weight, about 61 to about 65 percent KRATON™ G-1657, about 17 to about 23 percent polyethylene NA 601, and about 15 to about 20 percent REGALREZ™ 1126.

The '468 application material may have at least one layer of a relatively nonelastic gatherable material joined to the elastomeric nonwoven fibrous web at spaced apart locations to produce a composite elastic material and so the gatherable material is gathered between the spaced apart locations.

The gatherable layer can be a nonwoven web of fibers such as spunbond fibers, meltblown fibers, a bonded carded web of fibers, or a multilayer material including at least one of such fiber webs. The gatherable material may further include wood pulp, staple fibers, particulates or super-absorbent materials. The gatherable layer or layers may optionally include a pigment

in order to give the bandage a particular color. Such pigments are usually present in amounts of less than 5 weight percent, depending on how deep or rich a color is desired, if at all. Examples of such pigments include those available from the Standridge Chemical Company of Social Circle, Georgia, for example, SCC 4267 royal blue, SCC 3567 green, SCC 6482 tan, SCC 3566 red, SCC 3128 black, SCC 3565 yellow and SCC 4837 white.

An example of a gatherable multilayer laminate is an embodiment wherein some of the layers are spunbond and some meltblown such as a spunbond/meltblown/spunbond (SMS) laminate as disclosed in U.S. Patent no. 4,041,203 to Brock et al., U.S. Patent no. 5,169,706 to Collier, et al, and U.S. Patent no. 4,374,888 to Bornslaeger. Such a laminate may be made by sequentially depositing onto a moving forming belt first a spunbond fabric layer, then a meltblown fabric layer and last another spunbond layer and then bonding the laminate. Bonding can be accomplished in a number of ways such as needling, hydroentanglement, ultrasonic bonding, adhesive bonding, stitchbonding, through-air bonding and thermal bonding. Alternatively, the fabric layers may be made individually, collected in rolls, and combined in a separate bonding step. Such fabrics usually have a basis weight of from about 0.1 to 12 osy (6 to 400 gsm), or more particularly from about 0.75 to about 3 osy.

The coating material described in the '468 application may be in the form of a randomly scattered network of hot-melt adhesive filaments and/or fibers. The coating of cohesive material may be a coating of any suitable conventional commercially available hot-melt adhesive such as, for example, hot melt adhesives which may be based on blends of polyolefins, adhesive resins, triblocks and waxes.

A particularly good coating for the preferred embodiment of this invention is that of U.S. Patent 5,149,741, hereby incorporated by reference, to Alper et al. and assigned to Findley Adhesives, Inc., of Wauwatosa, WI. This coating is an adhesive which comprises about 15 to 40 parts of a styrene-isoprene-styrene block copolymer wherein the styrene content of

the copolymer is 25 to 50 weight percent, about 40 to 70 parts of a compatible tackifying resin such as, for example, pentaerythritol esters, about 5 to 30 parts of a napthenic/paraffinic oil and 0.1 to 2 parts, by weight, of a phosphite antioxidant, hindered phenolic antioxidant and a stabilizer, where the adhesive has a melt viscosity of not greater than 6000cP at 325°F.

The outer layer(s) of the bandage may be printed in a color or colors with various pictures or words of an instructive or aesthetic type. For example, the bandage may be printed with the words "OUCH", "HOT", "CALIENTE", etc. or may be printed with pictures of flames, peppers, horses, horseshoes, etc., or a combination of the above.

If the outer layer of the bandage is a nonwoven it may be optionally printed in accordance with the teachings of U.S. Patent Application 07/993,083 (the '083 application) and assigned to the same assignee.

The '083 application teaches printing a nonwoven web with an adhesive based ink. The ink includes a binder which may be a water-based, solvent-based or a hot-melt binder and which is present in a ratio to the pigment in the ink of between 10:1 and 1:1 on a dry weight basis of the total solids. The ink has a viscosity of between about 50 and 10,000 cps during application and after drying yields a crock value for the nonwoven of at least 4.

If the binder is water-based, the glass transition temperature (T_g) is in a range from approximately -60 to 180°F with a more desirable range being between about 20 and about 80°F. Such film-forming polymer binders produce flexible printed areas when dried or cured at relatively low drying temperatures which typically range between about 150 and 300°F. Polyvinyl alcohol (PVOH) and ethylene vinyl acetate (EVA) have been found to be particularly suitable as a base or binder for the inks of the present invention. The solids level of these binder polymers (PVOH and EVA) in the adhesive-based inks is between approximately 5 and 60% by weight on a dry weight basis of the total solids in the adhesive-based ink. Coloration can

be imparted to these binders by the use of inert pigments and dyes, collectively referred to as pigments for purposes of the claims, which can be added in levels of approximately 0.25 to 50% on a dry weight basis. Typically on a dry weight basis the solids level including all solids, not just the binder and pigment, will be 40% or greater for ethylene vinyl acetate and 8% or greater for polyvinyl alcohol. Other water-based ink binders include polyvinyl acetate, ethylene acrylic, vinyl acrylic, styrene acrylic, polyvinylidene chloride, starch, chemically modified starch, dextrin, and other lattice and water-soluble polymers having film forming properties.

Suitable solvent-based binders for adhesive-based inks include natural rubber and other elastomers, acrylics, polyurethanes, polyamides, phenoxies, and poly(vinyl acetal)s. A related composition is vinyl resin dispersed in a plasticizer to form a plastisol. Upon heating the plastisol forms a solution of sufficiently high viscosity at room temperature such that the cured adhesive has excellent shear resistance. Several of these solvent-based binders are commercially available, for example, National Starch and Chemical Company of Bridgewater, New Jersey sells a neoprene rubber based adhesive using toluene, hexane, acetone and isopropanol as solvents under the trademark SPRAYMASTER® 388.

Suitable hot-melt binders for use in conjunction with the adhesive-based ink include hot-melt binders based on polyethylene, other polyolefins or mixtures of the same, ethylene-vinyl acetate copolymers, polyamides, polyesters, and block copolymer rubbers. Typical additives used to modify the flow characteristics and other properties of these hot-melt binders include waxes, oils, terpene resins, rosin derivatives, phenolic resins (qv), and coumarone-indene resins. Hot-melt, binders are commercially supplied by many adhesive companies, for example, INSTANT-LOK® ethylene vinyl acetate-based binder is supplied by National Starch and Chemical Company of Bridgewater, New Jersey. Such hot-melt binders have a solids content of 100%. These hot-melt, adhesive-based inks typically melt and flow at temperatures ranging from between about 140

and about 300°F. For example, INSTANT-LOK® 34-4977 EVA-based binder has a softening temperature of 180°F. Its melt viscosity is 940, 590, 390 and 270 centipoise at temperatures of 250, 275, 300 and 325°F, respectively.

Dyes and inorganic and organic pigments (collectively "pigments") are the common colorants used in conjunction with these inks. The most common dyes include azo dyes (e.g. Solvent Yellow 14, Disperse Yellow 23, Metanil Yellow), anthraquinone dyes (Solvent Red 111, Disperse Violet 1, Solvent Blue 56 and Solvent Green 3), xanthene dyes (Solvent Green 4, Acid Red 52, Basic Red 1, and Solvent Orange 63), azine dyes (jet black) and the like.

Inorganic pigments include titanium dioxide (white), carbon black (black), iron oxides (red, yellow, brown), chromium oxide (green), ferric ammonium ferrocyanide (blue) and the like.

Major organic pigments include diarylide yellow AAOA (Pigment yellow 12), diarylide yellow AAOT (Pigment yellow 14), phthalocyanine blue (Pigment blue 15), lithol red (Pigment red 49:1) and Red lake C (Pigment red 53:1).

Most of these dyes and pigments are commercially supplied as color concentrates.

Plasticizers, extenders, thickening agents, defoaming agents, wetting agents or surfactants, waxes and antioxidants may be utilized in conjunction with the adhesive-based inks of the present invention.

In selecting an adhesive-based ink for optional use on a substrate, the choice of ink should be one which has a printing temperature which is below the melting temperature of the polymers used in the substrate. Commercially available inks are, for example, from the Findley Adhesive Company and sold under the designations Aqua L7064G319U, Blue L7064E293U, Red L7064R199U, and Lavender L7064P2562C.

Adhesive-based inks and polyolefin-based substrates are suitable for use with rotogravure, flexographic, screen printing and ink jet printing equipment.

In rotogravure, flexographic and screen printing equipment, the adhesive-based ink is transferred to a printing transfer

surface which contains the printed patterns and then from the transfer surface the ink is transferred directly to the substrate.

Rotogravure printing uses a print roll which is engraved therefore greatly increasing the life of the print pattern. Because of the engraving of the roll, it is also possible to get higher definition with respect to the printed pattern or graphics imparted to the substrate. Furthermore, rotogravure equipment generally can be run higher speeds than most of the other equipment and is suitable for use with water-based, solvent-based and hot-melt, adhesive-based inks.

In flexographic printing it is also easier to change the graphics and the printing plates are less expensive than some of the other equipment. It should be noted, however, that flexographic printing equipment is currently limited to water-based and solvent-based adhesive inks. Furthermore, care should be taken when using certain solvent-based inks as they may interfere or react with the rubber on the printing rolls thereby compromising the quality of the printing process and possibly damaging the equipment.

In comparison, screen printing equipment is relatively costly and only one color can be used per screen. Screen printing is used primarily for water-based and hot-melt adhesive-based inks and it should be noted that the equipment cannot be run as fast as, for example, flexographic printing equipment. When using hot-melt adhesive-based inks in conjunction with this equipment, the temperature range for the inks will usually be between about 140°F and about 300°F.

Ink jet printing equipment generally requires inks that have a very low viscosity, often in the range of 1 to 10 centipoise in order to achieve appropriate processing and application. Water-based adhesive-based inks such as polyvinyl alcohol can be brought into this range and, furthermore, water-based and solvent-based adhesive-based inks can be used in combination with the ink jet printing equipment. An additional advantage of ink jet printing equipment is the relatively high speed at which it can be run.

Yet another way to apply the adhesive-based inks to the substrates of the present invention is through the use of extrusion coating equipment. Extrusion coating equipment can be used to apply much wider and usually thicker coatings of adhesive-based inks to the surface of substrates. Such equipment and application techniques may be suitable where large areas of colored ink are desired. Once these large areas of ink have been applied, it is also possible to print other inks on top of the extrusion-coated layer.

The anti-chew or chew repellent substances which may be used in the practice of this invention are preferably oleo resin of capsicum, capsaicin and its derivatives, and pelargonic acid vanillylamide (PAVA), a synthetic form of capsaicin. The capsicum hot pepper is the source for capsaicin and its derivatives and oleo resin of capsicum. Capsaicin is also known as N-(3-methoxy-4-hydroxybenzyl)-8-methylnon trans-6-enamide and has a molecular weight of 305. Capsaicin has four derivatives, norhydrocapsaicin or 7-methyl-octanoic acid vanillylaminde with a molecular weight of 293, dihydrocapsaicin or 8-methylnonanoic acid vanillylamide with a molecular weight of 307, homocapsaicin or 9-methyldec-trans-7-enoic acid vanillylamide with a molecular weight of 319, and homodihydrocapsaicin or 9-methyl-decanonic acid vanillylamide with a molecular weight of 321.

Any other substance found to be effective may be used as well. Such other substances include a number mentioned in the article <u>Use of Taste Repellents and Emetics to Prevent Accidental Poisoning of Dogs</u> by Houpt et al., 45 American Journal of Veterinary Research, no. 8 (August 1984), at 1501-1503. These include IFF hot (compound 135-60348), bitter apple, quassia wood, horseradish extract, sucrose octaacetate and pepperoni enhancer. Another useful substance is cinnamic aldehyde.

Commercial materials which serve as anti-chew substances are available from Penta Manufacturing of Fairfield, N.J. in a number of grades; Capsaicin synthetic (PAVA), CAS number 2444-46-4, is a white to brown powder with approximately 98% active

ingredient; oleo resin of capsicum or natural capsaicin, CAS number 8023-77-6 has approximately 6 to 7% active ingredient, and two other grades of natural capsaicin purified to about 65 and 98% active ingredient. Similar materials are available from Fluka Chemical Corp., 980 South Second St, Ronkonkoma, NY 11779-7238.

The effective amount of anti-chew substance added to the component(s) of the bandage has been found to be surprisingly small. Amounts as low as 10 parts per million (ppm) have been found to be effective. The range for the anti-chew substance in the bandage of this invention is between 10 and 10000 ppm (0.001 and 1 weight percent), or more particularly between 500 and 1500 ppm. Amounts above the upper range may be used and will be effective but provide little if any greater repellent effect than the amounts within the range, though at greater cost.

The instant invention includes the anti-chew substance as an internal, not topical additive, into any of the components of the bandage including by way of illustration but not limitation the nonwoven or woven elastic bandage substrate, the optional adhesive or cohesive coating of the bandage substrate or the optional substrate surface printing ink, or any combination of these materials.

The anti-chew substance can be added to the desired bandage component by any method known to those skilled in the art. Mixing the anti-chew substance with the desired component in a large mixing vessel with agitation is one simple method. Metering the proper amount of anti-chew material into a pipe containing the (flowing) desired component is another.

Many of the repellent substances are insoluble in water, therefore making them more desirable for use in the hot-melt adhesive or substrate parts of the bandages. Others are soluble in water, lending themselves to use in water-based ink. Combinations of these water soluble and insoluble repellents is possible in the practice of this invention by including such repellents in the layer in which they are compatible, thereby providing this invention with great versatility.

Veterinary bandages were produced according to this invention as Examples 1 and 2 below, using the following base sheet as a substrate.

BASE SHEET

A bandage for veterinary use was made using a layer of elastomeric meltblown nonwoven fabric which had on each side an SMS layer.

The approximately 0.6 osy (20 gsm) basis weight SMS layer was comprised of two spunbond layers of about 0.245 osy (8 gsm) basis weight. The polymer used to produce the spunbond layer was commercially available PF-304 polypropylene from Himont Incorporated of Wilmington, Delaware. The meltblown layer was produced at a basis weight of about 0.11 osy (4 gsm) from commercially available 3746G polypropylene from the Exxon Chemical Company of Baytown, Texas. Each layer had a pigment in an amount of less than about 5 weight percent.

The two spunbond and one meltblown layers were thermally bonded together using a wire weave pattern at a temperature of 285°F (140°C).

After bonding the SMS laminate was flexographically printed in the example having printing.

The stretched elastomeric meltblown layer was produced at a basis weight of about 2 osy (70 gsm) from commercially available Kraton® G2740X polymer from the Shell Chemical Company of Houston, Texas.

The elastomeric meltblown layer with an SMS layer on each side was bonded together to produce a composite elastic material according to the procedure of U.S. Patent 4,720,415.

The laminate was then ultrasonically rebonded while extended to 98 percent of total available stretch with a small random dot pattern having about a 5 percent bond area. This was done in order to ensure sufficient integrity so that the laminate would not delaminate during use.

EXAMPLE 1

A veterinary bandage was produced as above. About 7000 ppm of the active ingredient of the anti-chew substance capsaicin synthetic or PAVA from Penta Manufacturing was added only to a hot-melt coating which was applied to the composite elastic material in an amount of about 3 gsm per side to produce the final bandage. The hot-melt material used was from the Findley Adhesive company under the designation H2174-01. The PAVA was added to the hot-melt and mixed by conventional means in order to disperse the material in the coating. This bandage was found to deter removal by licking and chewing when the bandage was applied to a dog.

EXAMPLE 2

A veterinary bandage was produced as above. About 0.32 grams per pound of ink of PAVA from Penta Manufacturing and about 41 grams per pound of oleo resin of capsicum was added only to a water-based ink, Findley Adhesives' L7064R199U, which was applied to the gatherable nonelastic material. The PAVA and oleo resin were added to the ink and mixed by conventional means in order to disperse the material in the ink. The final amount of active ingredient in the ink was about 7000 ppm. This bandage was found to deter removal by licking and chewing when the bandage was applied to a dog.

While the Examples illustrate two particular embodiments, those skilled in the art will recognize that many other embodiments are possible without departing from the spirit of the invention. For example, a bandage could be produced having an effective amount of anti-chew substance internally added to the elastic substrate and without an adhesive or cohesive coating and without substrate surface printing, and yet be within the scope of the present invention. A bandage having a substrate and only an adhesive or cohesive coating containing an effective amount of anti-chew substance without any

substrate surface printing would be within the scope of the present invention. A bandage having a substrate with substrate surface printing containing an effective amount of anti-chew substance and without any adhesive or cohesive coating would be within the scope of the present invention. Likewise, a bandage having an effective amount of anti-chew substance added to the substrate, coating and printing would be within the scope of the present invention.

What is claimed is:

1. An elastic veterinary bandage having anti-chew properties comprising:

an elastic substrate, and;

an anti-chew substance in an effective amount internally added to a material selected from the group consisting of said substrate, an adhesive-based substrate printing ink, an adhesive or cohesive substrate coating and combinations thereof.

2. The veterinary bandage having anti-chew properties of claim 1 wherein said anti-chew substance is selected from the group consisting of oleo resin of capsicum, capsaicin and its derivatives, and pelargonic acid vanillylamide, and is present in an amount between 10 and 10000 ppm.

3. The veterinary bandage having anti-chew properties of claim 1 wherein said substrate is selected from the group consisting of elastic woven materials and elastic nonwoven materials.

4. The veterinary bandage having anti-chew properties of claim 1 wherein said substrate is an elastic nonwoven material having elastic threads therein.

5. The veterinary bandage having anti-chew properties of claim 1 wherein said anti-chew substance is present in said substrate in an amount of between about 500 and 1500 ppm.

6. The veterinary bandage having anti-chew properties of claim 1 wherein said anti-chew substance is present in said ink in an amount of between about 500 ppm and 1500 ppm.

7. A cohesive, breathable and stretchable veterinary bandage having anti-chew properties comprising:

a composite elastic material laminate substrate comprising at least one elastomeric and at least one relatively nonelastic gatherable material joined to the

elastomeric material at spaced apart locations so that the gatherable material is gathered between the spaced apart locations, and;

a coating of a cohesive material on at least a portion of at least one exterior surface of said laminate, and;

an anti-chew substance in an effective amount included in a bandage component selected from the group consisting of said coating, said elastomeric material, said relatively nonelastic gatherable material, a water-based surface printing ink and combinations thereof.

8. The veterinary bandage having anti-chew properties of claim 7 wherein said elastomeric meltblown layer is comprised of a polymer selected from the group consisting of polyurethanes, copolyether esters, polyamide polyether block copolymers, ethylene vinyl acetates (EVA), and copoly(styrene/ethylene-butylene).

9. The veterinary bandage having anti-chew properties of claim 7 wherein said anti-chew substance is selected from the group consisting of oleo resin of capsicum, capsaicin and its derivatives, and pelargonic acid vanillylamide and is present in an amount between 10 and 10000 ppm.

10. The veterinary bandage having anti-chew properties of claim 1 wherein said anti-chew substance is present in said ink in an amount of about 700 ppm and said ink is water-based and applied to said substrate by a method selected from the group consisting of flexographic printing, rotogravure printing, ink jet printing and extrusion.

11. An elastic veterinary bandage having anti-chew properties comprising:

an elastic substrate, and;

an anti-chew substance in an effective amount internally added to any component of said bandage and combinations thereof.

INTERNATIONAL SEARCH REPORT

International Application No
PCT/US 96/01760

A. CLASSIFICATION OF SUBJECT MATTER
IPC 6 A61D9/00 A61L15/42

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC 6 A61D A61L

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	DE,A,35 25 741 (BRUHN) 29 January 1987 see claim 2 ---	1
A	US,A,3 802 817 (MATSUKI) 9 April 1974 cited in the application see the whole document -----	1

☐ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

* Special categories of cited documents :

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier document but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

"&" document member of the same patent family

1

Date of the actual completion of the international search	Date of mailing of the international search report
4 July 1996	11.07.96

Name and mailing address of the ISA	Authorized officer
European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Tx. 31 651 epo nl, Fax (+31-70) 340-3016	Vanrunxt, J

INTERNATIONAL SEARCH REPORT

Information on patent family members

Int ional Application No
PCT/US 96/01760

Patent document cited in search report	Publication date	Patent family member(s)		Publication date
DE-A-3525741	29-01-87	NONE		
US-A-3802817	09-04-74	DE-A-	2048006	08-04-71
		FR-A,B	2064087	16-07-71
		GB-A-	1335216	24-10-73